

REMARKS

Reconsideration of this application, as amended, is respectfully requested.

Claims 1-22 are pending. Claims 1-6, 8, 10-12 and 16-21 stand rejected. Claims 2-4, 6-7, 9, 11 and 14-22 have been objected to.

Claims 1 - 3, 5, 7, 9, 11, and 13 - 22 have been amended. Claims 4 and 6 have been cancelled. Claim 23 has been added. Support for the amendments is found in the specification, the drawings, and in the claims as originally filed. Applicants submit that the amendments do not add new matter.

Drawings

New corrected drawings are required in this application because Figure 3 has stray markings and numerical markings that are not clear. Other hand-drawn figures similarly contain unclear numerals and blurred depictions.

New corrected drawings have been submitted with this response to satisfy the objections of the Examiner.

Claim Objections

Claims 2-4, 6-7, 9, 11 and 14-22 have been objected to for various informalities. Claims 2-4, 6-7, 9, 11 and 14-22 have been amended to overcome these objections.

Rejections Under 35 U.S.C. § 102(e)

Claims 1-6, 8, 10-11 and 16-21 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,266,462 of Kim ("Kim"). The Examiner stated that

Regarding claim 1, Kim teaches an acousto-optic filter comprising: an optical fiber having an interaction length (Figure 4, item 36); a wave generator (Figure 11) coupled to the optical fiber and generating an acoustic wave in the optical fiber; and a damper (Figure 4, item 30) located on the optical fiber with the interaction length between the wave generator and the damper, the damper having a first surface which, as viewed in cross-section through the damper and fiber at right angles to a direction in which the fiber extends, covers a portion only of the optical fiber...

Regarding claim 15, Kim teaches an acousto-optic filter comprising: an optical fiber (12) having an interaction length (36); a wave generator (Figure 11) coupled to the fiber and generating an acoustic wave in the optical fiber (Column 5); and one or more dampers (30 and Column 9, line 51 – Column 10, line 25) defining a plurality of surfaces transverse to a direction in which the acoustic wave travels, wherein reflection of the acoustic wave by the surfaces back towards the wave generator at least partially cancel one another out (Column 9, line 51 – Column 10, line 25)...

Regarding claim 21, Kim teaches a method of filtering light comprising: transmitting light through an optical fiber (12); vibrating a first end of an interaction length of the fiber to generate an acoustic wave traveling through the interaction length (Column 5-6); and damping the transverse wave with a damper (30) at a second, opposing end of the interaction length, the damper having a first surface which is slanted so that the damper covers a portion only of the optical fiber as viewed in cross-section through the damper and the fiber at right angles to a direction in which the fiber extends.

(p. 4-6, Office Action 8/13/03)

Applicants respectfully submit that claim 1, as amended, is not anticipated by Kim.

Claim 1 includes the following limitations.

An acousto-optic tunable filter comprising:
an optical fiber having an interaction length;
a wave generator coupled to the optical fiber and generating an acoustic wave in the optical fiber; and
a damper located on the optical fiber with the interaction length between the wave generator and the damper, the damper having a proximal surface relative to the wave generator, the proximal surface continuously slanted relative to longitudinal axis of the optical fiber.

(Amended Claim 1)(Emphasis Added)

Applicants have amended claim 1 to more distinctly claim the invention. Kim does not include the limitation of a damper having a “continuously slanted” proximal surface. The damper of Kim has a damper 30 with a tapered proximal end 34 that is discontinuously slanted (See Kim, Col. 7, lines 33 – 34, and Figure 4)

For this reason, applicants respectfully submit that claim 1, as amended, is not anticipated by Kim. Given that claims 2, 3, 5, 8, 10, and 11 depend, directly or indirectly from claim 1, applicants respectfully submit that claims 2, 3, 5, 8, 10, and 11 are, likewise, not anticipated by Kim.

It appears the Examiner is rejecting claim 15 as anticipated by Kim. Applicants respectfully submit that claim 15, as amended, is not anticipated by Kim. Claim 15 includes the following limitations.

An acousto-optic filter comprising:
an optical fiber having an interaction length;
a wave generator coupled to the fiber and generating an acoustic wave in the optical fiber; and
one or more dampers located on the optical fiber with the interaction length between the wave generator and the one or more dampers, such that the one or more dampers define a plurality of surfaces, the surfaces continuously slanted relative to longitudinal axis of the optical fiber such that back reflections of the acoustic wave at least partially cancel out forward propagation of the acoustic wave.

(Amended Claim 15) (Emphasis added)

Applicants have amended the claim to more distinctly claim the invention. Applicants respectfully submit that Kim does not disclose the limitation of one or more dampers located on the optical fiber with the interaction length between the wave generator and the one or more dampers that define a plurality of continuously slanted surfaces.

Kim discloses

Acoustic reflections at proximal face can be advantageous if controlled. By introducing some amount of reflection, and choosing a right thickness of heatsink 44, the RF response spectrum of acoustic wave generator 24 can be modified so the overall launching efficiency of the acoustic wave in optical fiber can be less dependent on the RF frequency.

In this case, the reflectivity and size of heatsink 44 is selected to provide a launching efficiency of the flexural wave into optical fiber 12 almost independent of an RF frequency applied to acoustic wave generator 24. The thickness of heatsink 44 is selected to provide a travel time of an acoustic wave from distal face 48 to proximal face 46, and from proximal face 46 to distal face 48 that substantially matches a travel time of the acoustic wave traveling through acoustic wave propagation member 24 from its proximal end to its distal end, and from its distal end to its proximal end. The heat sink material or the material for the attachment to the proximal face 46 is selected to provide the amount of back reflection from the heat sink that substantially matches the amount of back reflection from the acoustic wave propagation member. In various embodiments, the proximal and distal faces, 46, 48 of heatsink 44 have either rectangular or circular shapes with the following dimensions: 10.times.10 mm.sup.2 for the rectangular shape and diameter of 10 mm for the cylindrical shaped heat sink.

However, acoustic back reflections due to proximal face 46 are preferably avoided. Acoustic reflections from the heat sink back to the acoustic wave generator are reduced by angling proximal face 46 at an angle greater than 45 degree or by roughing the face. The acoustic wave coming from the acoustic generator toward the angled proximal face 46 is reflected away from the acoustic generator, reducing the acoustic back reflection to the acoustic wave generator. The roughed face also reduces the acoustic reflection by scattering the acoustic wave to random directions. Preferably, the side faces of the heat sink are also roughened or grooved to scatter the acoustic wave and thereby to avoid the acoustic back reflection. Another method to reduce the back reflection is to attach an acoustic damping material at the proximal face 46. Suitable materials that reduce back reflections include soft polymers, silicone, and the like that can be applied to proximal face 46.

(Kim, col. 9, line 51 – col. 10, line 25) (Emphasis added)

The proximal surface 46, referred to in Kim as “providing back reflection” is the surface of the heat sink 44, not the damper 30. For these reasons, applicant respectfully submits that claim 15 is not anticipated by Kim. Given that claims 16 – 21 depend, directly or indirectly, from claim 15, applicants respectfully submit that claims 16 – 21 are, likewise, not anticipated by Kim.

Rejections Under 35 U.S.C. § 103(a)

Claim 12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,266,462 of Kim ("Kim").

Applicants respectfully submit, however, that claim 12 is not obvious under 35 U.S.C. § 103(a) in view of Kim due to its indirect dependence upon claim 1 as discussed above.

Claims 7, 9, 13, 14, and 22 have been determined by the Examiner to contain allowable subject matter. Applicants have amended the claims to more distinctly claim the invention. Applicants further submit that claims 7, 9, 13, and 14 are allowable based upon their direct, or indirect, dependence on claim 1 as discussed above.

It is respectfully submitted that in view of the amendments and arguments set forth herein, the applicable rejections and objections have been overcome. If there are any additional charges, please charge Deposit Account No. 02-2666 for any fee deficiency that may be due.

Respectfully submitted,

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